

WHAT IS CLAIMED IS:

1. A product shape designing device, comprising:

a measurement unit that measures a human body shape A,  
a human body shape B and a product shape C which fits the human  
5 body shape A;

a pre-processing unit that converts data of the measured  
shapes into data expressing the human body shape A and the  
human body shape B with the same number of coordinate points  
on an identical geometric structure; and

10 a calculation unit that calculates, based on the data  
converted by the pre-processing unit representing the human  
body shape A, the human body shape B and the product shape  
C, a deformed grid G in which a deviation among individuals  
of the human body shape A and the human body shape B, and a  
15 deviation between a circumferential length of a cross-section  
H determined according to the product shape C and a target  
circumferential length of the cross-section are minimized at  
a time, and applies the deformed grid G thus calculated to  
the product shape C to thereby deform the product shape C,  
20 so as to output data of a new product shape F that fits the  
human body shape B.

2. The product shape designing device according to claim  
1, wherein the measurement unit only measures the human body  
shape B; and

25 the human body shape A includes standard human body shape  
data, and the product shape C data includes product shape data  
that fits the standard human body shape.

3. The product shape designing device according to claim 1, wherein the measurement unit measures a human body shape and an anatomical landmarks of a human body; and

the pre-processing unit converts the data of the human  
5 body shape and the anatomical landmarks measured by the measuring unit into the data expressing the human body shape with the same number of coordinate points on an identical geometric structure.

4. The product shape designing device according to claim  
10 1, wherein the calculation unit deforms the grid, when calculating a deformed grid for deforming a human body shape into another human body shape, under a condition that a circumferential length of a specific cross-section of an existing product shape becomes a predetermined value.

15 5. A method of designing a product shape, comprising:  
measuring a human body shape A, a human body shape B and a product shape C which fits the human body shape A;

converting data of the measured shapes into data  
expressing the human body shape A and the human body shape  
20 B with the same number of coordinate points on an identical geometric structure;

calculating, based on the data converted by the  
pre-processing unit representing the human body shape A, the human body shape B and the product shape C, a deformed grid  
25 G in which a deviation among individuals of the human body shape A and the human body shape B, and a deviation between a circumferential length of a cross-section H determined

according to the product shape C and a target circumferential length of the cross-section are minimized at a time; applying the deformed grid G thus calculated to the product shape C to thereby deform the product shape C; and outputting data  
5 of a new product shape F that fits the human body shape B.

6. A computer program for designing a product shape that fits a human body, comprising:

a first step of converting measurement data of a human body shape A, a human body shape B and a product shape C which  
10 fits the human body shape A into data expressing the human body shape A and the human body shape B with the same number of coordinate points on an identical geometric structure; and

a second step of calculating, based on the data converted by the pre-processing unit representing the human body shape  
15 A, the human body shape B and the product shape C, a deformed grid G in which a deviation among individuals of the human body shape A and the human body shape B, and a deviation between a circumferential length of a cross-section H determined according to the product shape C and a target circumferential  
20 length of the cross-section are minimized at a time, and applying the deformed grid G thus calculated to the product shape C to thereby deform the product shape C, so as to output data of a new product shape F that fits the human body shape B.

25 7. A recording medium containing a computer program for designing a product shape that fits a human body, wherein the computer program comprises a first step of

converting measurement data of a human body shape A, a human body shape B and a product shape C which fits the human body shape A into data expressing the human body shape A and the human body shape B with the same number of coordinate points  
5 on an identical geometric structure; and a second step of calculating, based on the data converted by the pre-processing unit representing the human body shape A, the human body shape B and the product shape C, a deformed grid G in which a deviation among individuals of the human body shape A and the human body  
10 shape B, and a deviation between a circumferential length of a cross-section H determined according to the product shape C and a target circumferential length of the cross-section are minimized at a time, and applying the deformed grid G thus calculated to the product shape C to thereby deform the product  
15 shape C, so as to output data of a new product shape F that fits the human body shape B.